UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Alaska Fisheries Science Center
Resource Assessment and Conservation
Engineering Division
7600 Sand Point Way Northeast
BIN C15700, Building 4
Seattle, Washington 98115-0070

December 18, 1991 F/AKC1:NP

CRUISE RESULTS

Chartered R/V Alaska

Cruise No. Alaska 91-03

Sablefish Abundance and Size Composition at
Indexing Sites off California and Southern Oregon

CRUISE PERIOD AND AREA

Between September 3 and October 15, 1991, the research vessel Alaska was under charter to obtain indices of sablefish (Anoplopoma fimbria) abundance at nine trap sites off California and southernmost Oregon (Figure 1). Depths surveyed ranged from 150 to 850 fm. These sites were also monitored in 1984, 1986, and 1988. Results have been used to advise the Pacific Fishery Management Council (PFMC) as to the status of sablefish stocks.

OBJECTIVES

The principal objectives of the cruise were to:

1. Obtain standardized catch per unit effort (CPUE) of sablefish at selected abundance index sites which are fished every 2-3 years to discern population trends.

2. Collect biological data including maturity, length, sex, and age composition to evaluate changes in the biological characteristics of the sablefish in the region.

3. Tag those sablefish which were not required for biological samples and inject them with oxytetracycline (OTC) to validate age determining methods and to continue studies on movements.

VESSEL AND EQUIPMENT

The research vessel Alaska is a 30.5-m commercial fishing vessel operated by the University of Washington. The sampling was conducted with traps on a longline. The traps were conical in shape and consisted of an iron framework incorporating a bottom ring of 54-in outer diameter (O.D.) and a top ring of 33.5-in O.D. The framework was 28-in high and was covered with 2-1/4-in #42 thread nylon webbing. A tunnel was located on the side and was constructed of 2-in nylon knotless web. All tunnels were rigged with a noose arrangement which was closed approximately 24 hr (± 1 hr) after setting by a magnesium alloy timed-release device. A single set, or string, consisted of 10 traps attached to a 550-fm, 5/8-in synthetic groundline by gangions at 50-fm intervals. A perforated plastic bait jar containing approximately two pounds of chopped herring was hung in each trap.

METHODS

Sampling proceeded from north to south at the nine index sites off California and southern Oregon (Figure 1). At each site, trap strings were set as near as possible to the standard depths of 225, 300, 375, 450, and 525 fm which have been fished during every survey. When time and weather conditions permitted, an additional string of traps was set at 150 fm and between 630 and 850 fm to obtain information on the portions of the population in depths shallower and deeper than those routinely sampled. The traps were hauled after a 24-hr soak, catches were processed, and traps were set again for a replicate sample at each depth. If for extenuating circumstances part or all of the second set could not be completed, the catch on the second set was estimated by using the rate of decline between the first and second sets at all other sites and depths (catch on the second set averaged 0.701 x catch on the first set). This adjustment allows for utilization of partial site data in interannual comparisons of CPUE.

Sablefish not required for biological samples were placed into "live" tanks supplied with fresh running seawater immediately after the catch was brought aboard. Anesthetic was not used. Usually within 15 min of the completion of each haul, all viable sablefish were measured to the nearest cm in a padded tagging cradle. The sablefish were tagged with a single blue Floy[1] anchor tag implanted just below the first dorsal fin and injected with an intraperitoneal dose of 30 mg of oxytetracycline (OTC) per kg of weight.

---

[1] Reference to trade name does not imply endorsement by the National Marine Fisheries Service, NOAA.

Standard data collections included:

1. number and weight of species captured in each trap;

2. length frequencies of all sablefish; and

3. otoliths, sex and sexual maturity from a random sample of 20 sablefish captured at each depth at each site.

RESULTS

All index sites were sampled and only at the 375, 450, and 525 fm depths off Cape Sebastian was the second set not completed. The additional 150 fm depth was fished at all sites and the 630-850 fm depth interval was sampled at all sites except those off Cape Sebastian and Pt. Arena.

Sablefish catch rates were highest at the three southern sites (Cortes Bank, Carmel Bay, and Morro Bay) and lowest at Pt. Arena, Half Moon Bay, Pt. Delgada, and Cape Mendocino (Table 1). When site data are combined, the numbers of sablefish caught increased sharply between 150 and 225 fm but decreased with depth beyond 225 fm. Standardized fishing effort at 150, 225, 300, 375, 450, 525, and >600 fm produced 11.0%, 34.0%, 23.2%, 13.0%, 6.1%, 5.7%, and 7.0%, respectively, of the total number of sablefish captured. Catches averaged 1.5 fish per trap from 630-850 fm depths, slightly higher than at the 450 and 525 fm depths.

Catch rates (fish/trap/24 hr) in 1991 for the nine sites combined were approximately 67% lower than in 1988, 22% lower than in 1986, and 64% lower than in 1984. Between 1988 and 1991, catch rates decreased markedly at the Pt. Arena, Half Moon Bay, Carmel Bay, and Morro Bay sites (down 84%, 82%, 76%, and 75%, respectively) and decreased the least at the Cape Sebastian and Cortes Bank sites (down 24% and 46%, respectively).

Sablefish length compositions and mean lengths by site are shown in Figure 2. The largest sablefish were found at the Pt. Arena, Pt. Delgada, Pt. St. George, and Cape Mendocino sites (mean lengths 57.2, 54.0, 53.3, and 53.1 cm, respectively); and the smallest were found at the Morro Bay and Cortes Bank sites (mean lengths 49.8 and 50.4 cm, respectively). Sablefish were larger in 1991 than in 1988 at all sites except Cape Sebastian, Morro Bay, and Cortes Bank. When data from all sites and standard depths (225-525 fm) were combined, the mean length increased from 50.8 cm in 1988 to 51.7 cm in 1991. This corresponds to an increase in mean weight from 2.71 lb in 1988 to 3.06 lb in 1991.

Sablefish length compositions and mean lengths by depth for all sites combined are shown in Figure 3. Mean length increased steadily with depth from 48.3 cm in 150 fm to 67.6 cm in depths >600 fm. Combining observations from standard depths at all sites, 62% of the sablefish caught were smaller than the commercial size limit (<53 cm fork length), 21% would be graded as small by processors (53-57 cm), 14% would be medium (58-67 cm), and 3% would be large (>67 cm).

Over 2,570 sablefish were tagged with blue anchor tags and released during the survey. Approximately 75% of all sablefish tagged were injected with OTC. The remaining 25% were control fish to determine to what extent the OTC injection affects survival. When possible, tissue samples for genetic studies were collected from the posterior section of the first dorsal fin of approximately 12 tagged sablefish from the 150, 225, and 300 fm sets at each site. Tissue was collected from both OTC-injected and control fish and was preserved in 100% ethanol and labeled with the tag number. These samples will be analyzed by Russ Vetter at the Southwest Fisheries Science Center, La Jolla, California.

SCIENTIFIC PERSONNEL

Leg I: September 4-24, 1991

1.	Norman Parks	AFSC	Field Party Chief
2.	Dennis Benjamin	AFSC	Biological Technician
3.	Gary Mundell	AFSC	Biological Technician
4.	Lynn Faughnan	AFSC	Biological Technician

Leg II: September 25-October 8, 1991

1.	Frank Shaw	AFSC	Field Party Chief
2.	Dennis Benjamin	AFSC	Biological Technician
3.	Jim Smart	AFSC	Net Mender
4.	Cindy Davis	AFSC	Bio. Tech. (9/25 to 9/29)
5.	Teresa Turk	AFSC	Bio. Tech. (9/29 to 10/8)

AFSC - Alaska Fisheries Science Center, Seattle, Washington

For further information contact Dr. Gary Stauffer, Director, Resource Assessment and Conservation Engineering Division, Alaska Fisheries Science Center, National Marine Fisheries Service, 7600 Sand Point Way NE., Building 4, BIN C15700, Seattle, WA 98115-0070. Telephone (206) 526-4170.

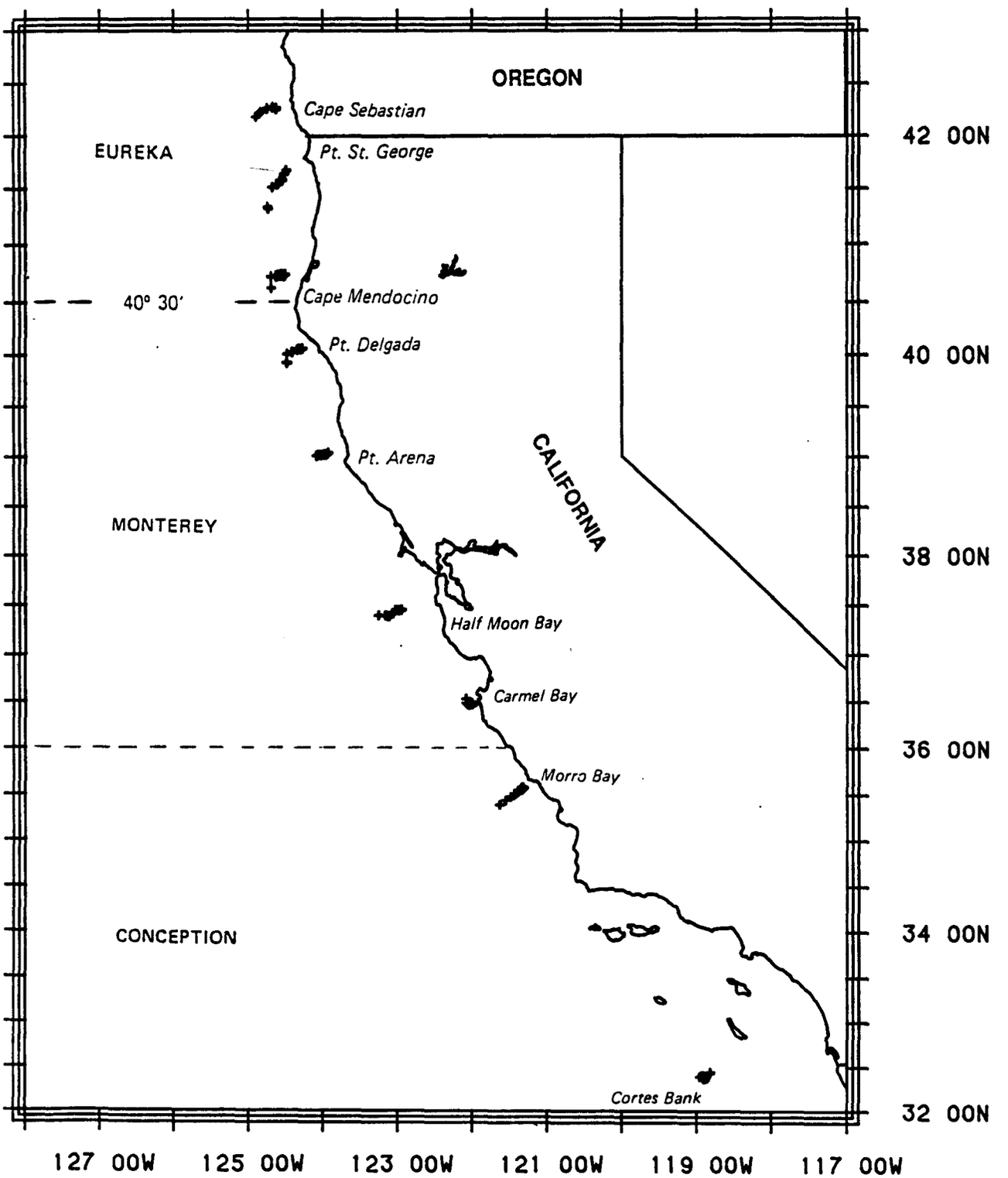


Figure 1.--Sites sampled off California and southern Oregon (International North Pacific Fisheries Commission areas Eureka, Monterey, and Conception) during the 1991 sablefish abundance indexing survey.

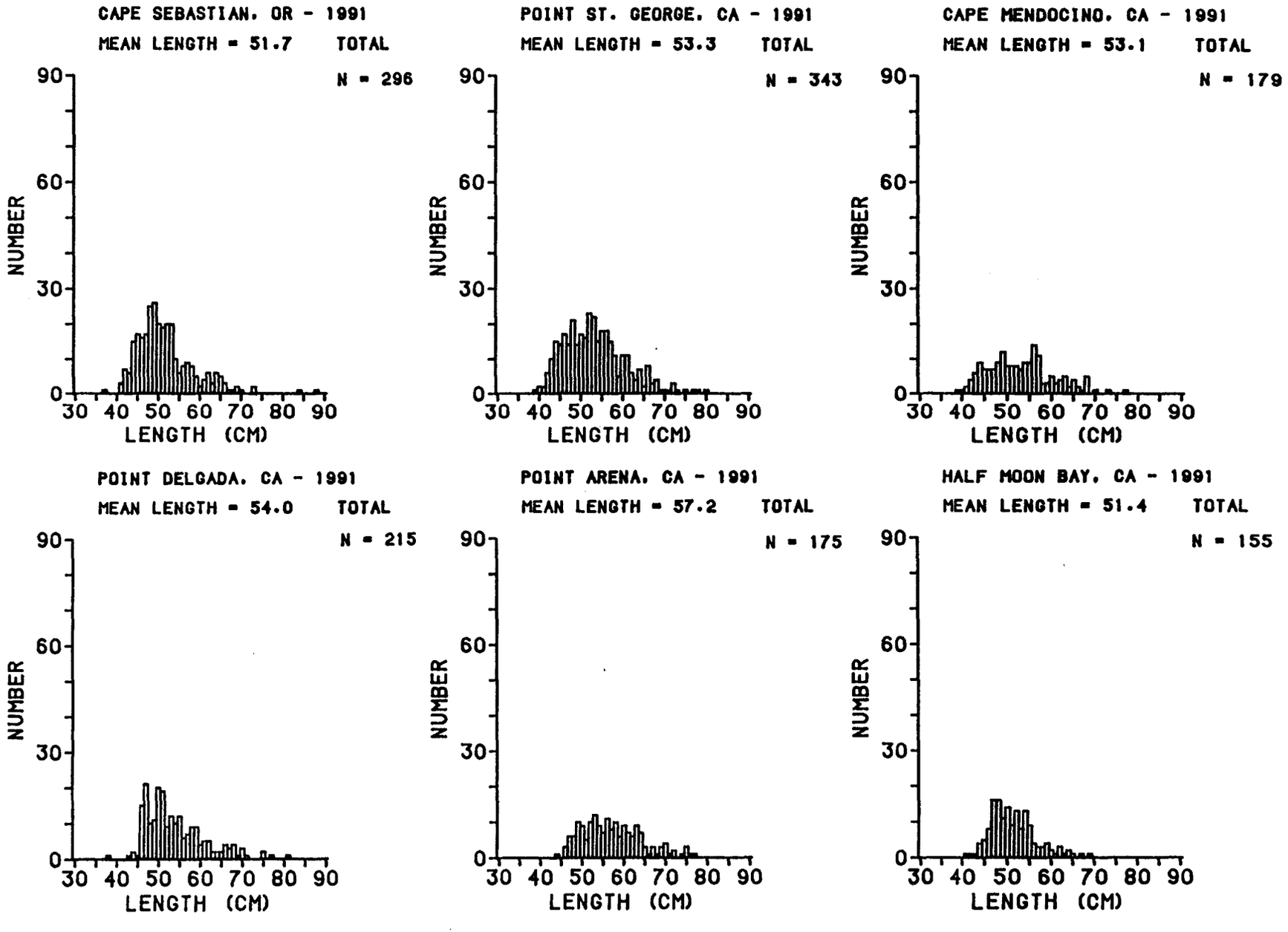


Figure 2.--Sablefish length compositions and mean lengths by abundance indexing site at the standard depths (225-525 fm) combined, Alaska Cruise 91-03.

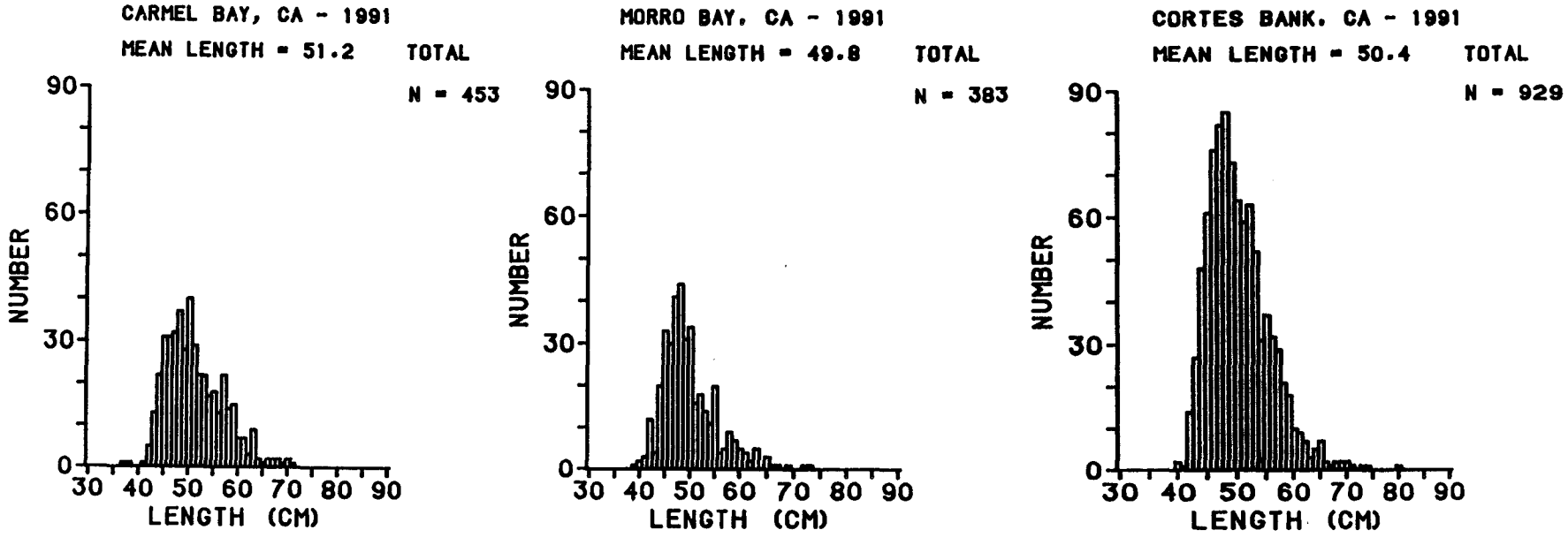


Figure 2.--(continued).

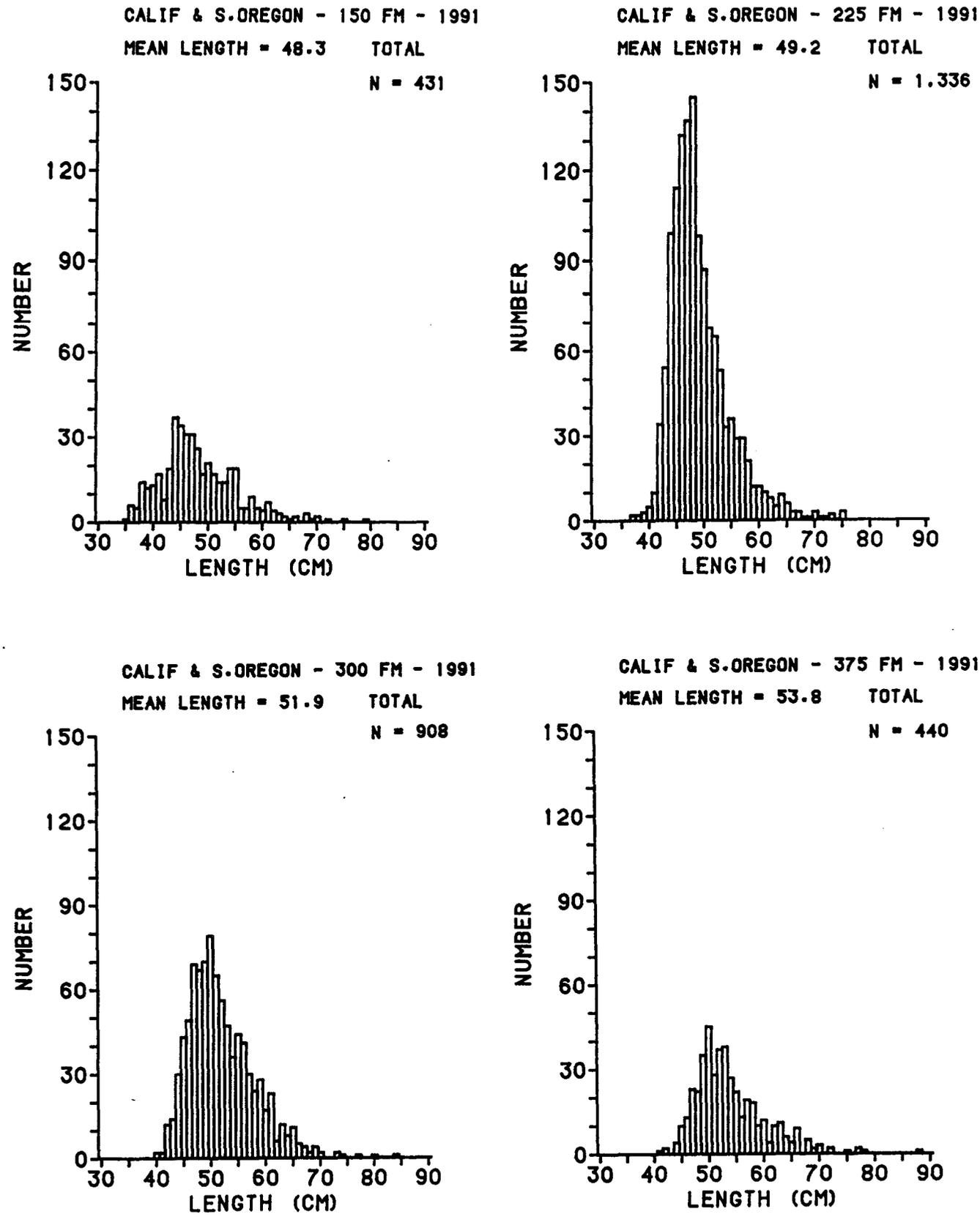
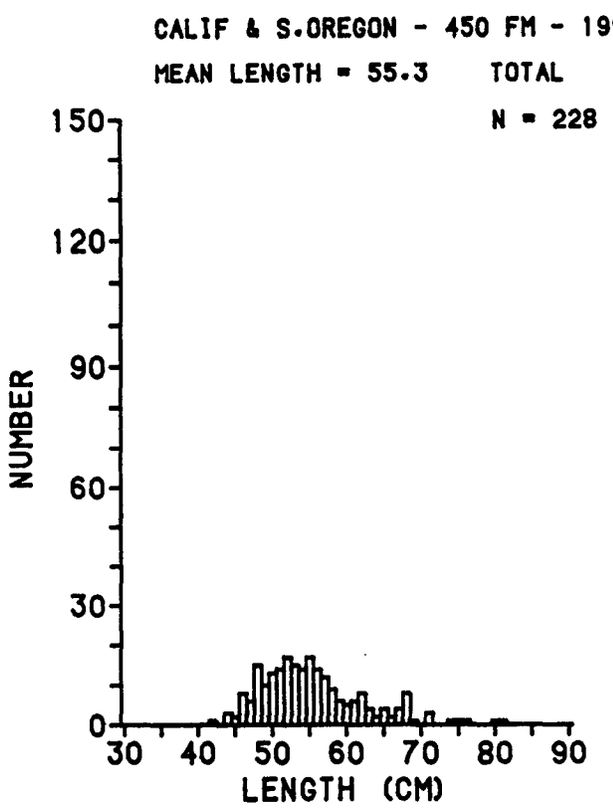
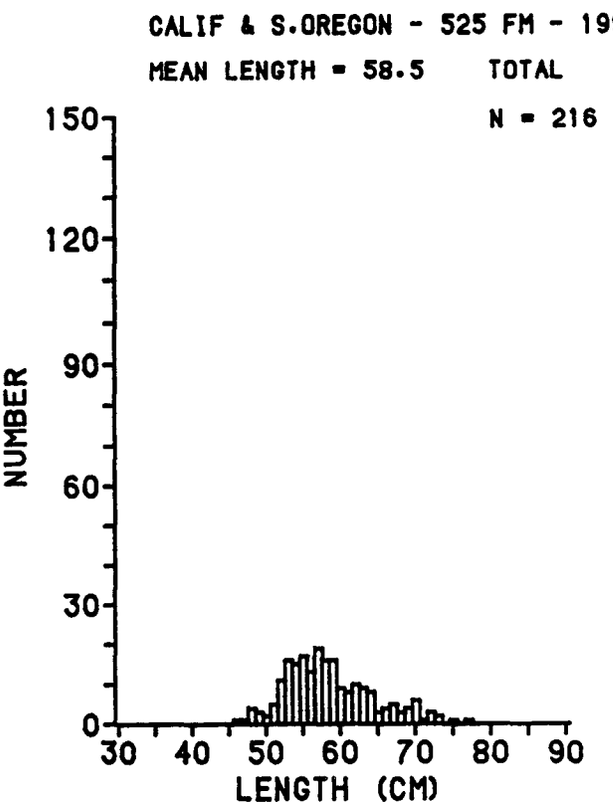


Figure 3.--Sablefish length compositions and mean lengths by depth for all sites combined, Alaska Cruise 91-03 (>600 fathoms fished at all sites except Cape Sebastian and Point Arena).





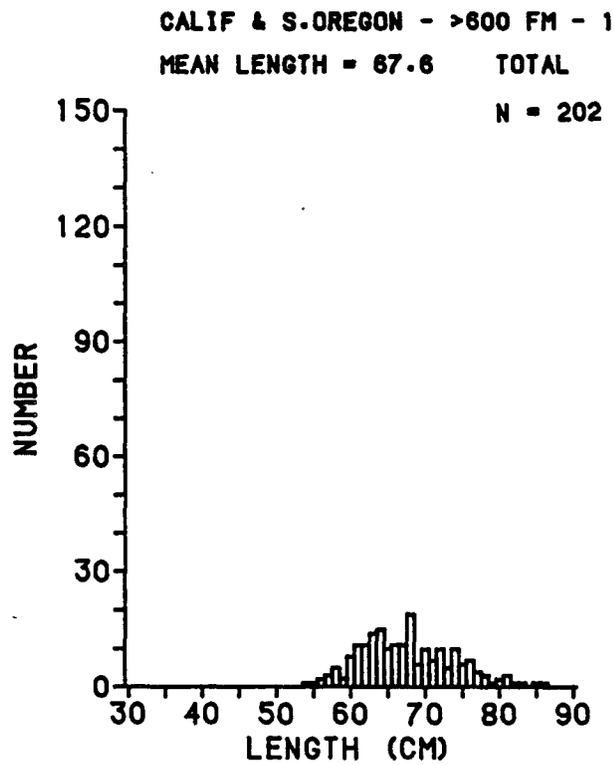


Figure 3.--(continued).

Table 1.--Sablefish catches, average number of fish per trap, average weight per trap (lb) and percentage above size limit[a] by indexing site and for all sites combined by depth, R/V Alaska Cruise 91-03.

Depth (fm)	No. of fish	No. per trap	Wt. per trap (lb)	% above size limit	No. of fish	No. per trap	Wt. per trap (lb)	% above size limit	No. of fish	No. per trap	Wt. per trap (lb)	% above size limit
	Cape Sebastian, OR				Pt. St. George, CA				Cape Mendocino, CA			
150	3	0.2	0.3	50	80	4.0	13.7	42	108	5.4	15.3	32
225	105	5.2	16.7	30	131	6.6	21.9	37	87	4.4	13.4	31
300	100	5.0	17.0	29	123	6.2	22.5	44	28	1.4	3.9	32
375	143[b]	7.2	23.0	45	53	2.6	13.3	70	27	1.4	6.4	33
450	20[b]	1.2	3.6	50	23	1.2	6.5	87	17	0.8	3.7	88
525	10[b]	0.5	3.0	83	13	0.6	3.0	85	23	1.2	6.0	100
630-850	--	--	--	--	20	1.0	7.6	100	20	1.0	10.6	100
All Depths	387	3.2	10.6	35	443	3.2	12.6	51	310	2.2	8.5	42
	Pt. Delgada, CA				Pt. Arena, CA				Half Moon Bay, CA			
150	14	0.7	2.4	57	19	1.0	2.6	32	42	2.1	5.3	31
225	103	5.2	17.5	37	42	2.1	7.0	35	33	1.6	4.1	15
300	51	2.3	8.8	43	38	1.9	8.4	76	33	1.6	4.2	21
375	32	1.6	5.5	50	36	1.8	8.3	71	49	2.4	7.0	29
450	21	1.0	5.5	90	17	0.8	4.1	82	8	0.4	1.3	38
525	13	0.6	3.3	92	45	2.2	10.8	93	32	1.6	7.6	84
630-850	36	1.8	14.0	100	--	--	--	--	58	2.9	26.3	100
All Depths	270	1.9	8.2	56	197	1.6	6.9	67	255	1.8	8.0	49

Table 1.--(Continued)

Depth (fm)	No. of fish	No. per trap	Wt. per trap (lb)	% above size limit	No. of fish	No. per trap	Wt. per trap (lb)	% above size limit	No. of fish	No. per trap	Wt. per trap (lb)	% above size limit
	Carmel Bay, CA				Morro Bay, CA				Cortes Bank, CA			
150	50	2.5	4.7	6	30	1.5	3.2	3	89	4.4	9.8	8
225	201	10.0	26.7	20	150	7.5	17.0	5	486	24.3	57.0	14
300	139	7.0	22.4	35	133	6.6	20.1	22	268	13.4	47.6	47
375	49	2.4	7.8	43	30	1.5	5.5	43	92	4.6	15.5	47
450	23	1.2	4.6	65	41	2.0	7.8	54	66	3.3	11.0	38
525	41	2.0	9.6	88	29	1.4	6.4	76	17	0.8	3.6	88
630-850	23	1.2	9.3	100	46	2.3	16.9	100	11	0.6	3.2	100
All Depths	526	3.8	12.1	36	459	3.3	11.0	31	1,029	7.4	21.1	28
	All Sites Combined											
150	435	2.4	6.4	25								
225	1,338	7.4	20.2	21								
300	913	5.1	17.2	39								
375	511	2.8	10.2	50								
450	240	1.3	5.4	61								
525	225	1.2	5.9	88								
630-850	214[c]	1.5	12.5	100								
All Depths	3,876	3.2	11.1	39								

[a] Sablefish smaller than 22 inches total length (52.4 cm fork length) or 15.5 inches dorsal length (origin of dorsal fin to the tip of the tail if beheaded).

[b] Adjusted upward for second set which was not made.

[c] 630-850 fathom depth fished at seven sites.